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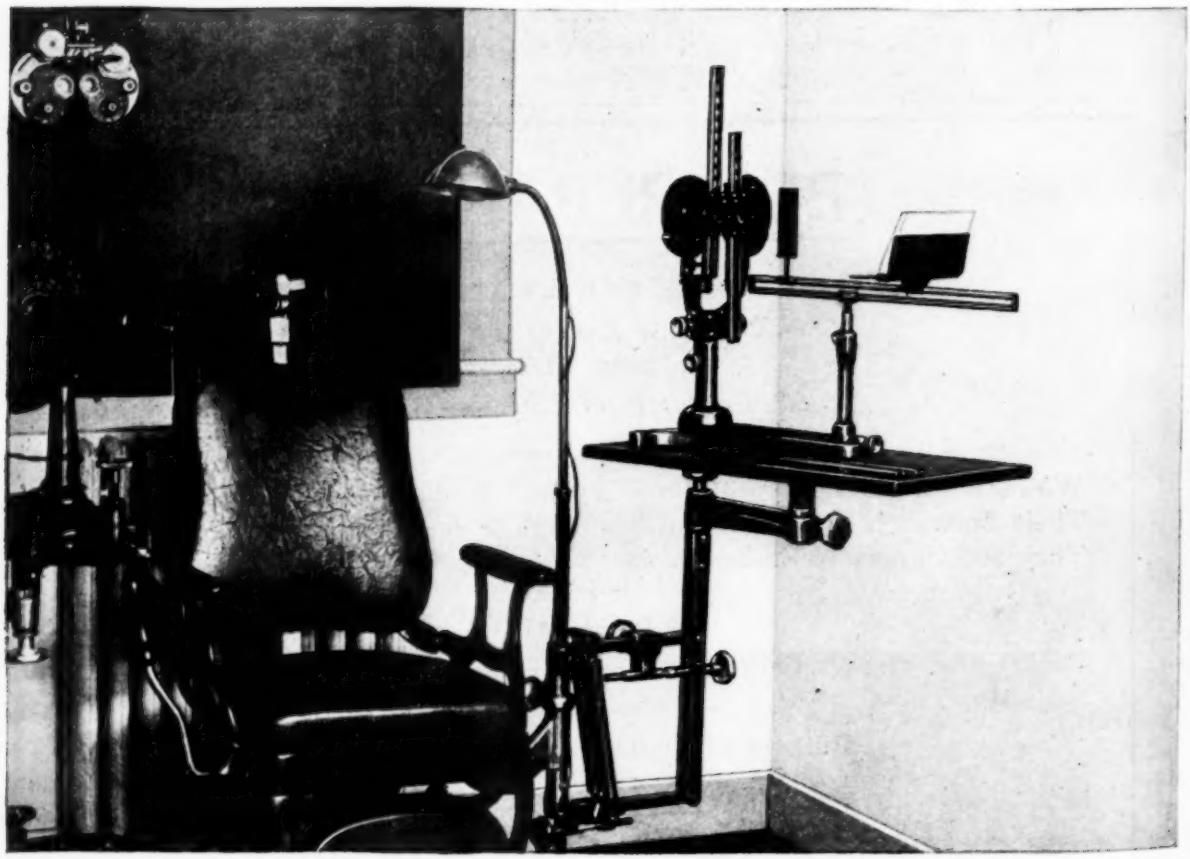

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AMERICAN JOURNAL OF OPTOMETRY

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OCULAR PSYCHOMETRY

Being an Outline of the Fundamental Principles Governing the Control of the Ocular Muscles.

Carl F. Shepard, O. D., D. O. S., and

Wm. Arthur Mendelsohn, Oph. D., Opt. D.

CHAPTER I.

Life is the process of continued adjustment to a changing environment. Every physical action, or mental conception is, directly or indirectly, the result of external stimulation by means of which the body is made aware of environmental change. That which we call "the mind" is the clearing house of the human system wherein the reports of environmental change, brought in by the "senses," are analyzed, and filed for further reference; and from which orders go out directing the adjustment of the body to the changes of environment.

A review of authorities discloses that "the mind" cannot be definitely located because every cell of which the body is composed seems to have a certain "intelligence" of its own. However, the brain and spiral cord is usually conceded to be the main office of the intelligence department, and the nervous system, the means of communication with other departments. Undoubtedly it is through the brain that we are aware of our bodies, and of the world about us; but we are never aware of the brain itself, or of the nervous system. We are conscious only of those things which are reported to the brain, through the nervous system.[1]

Of the special senses whose duty it is to report environmental changes to the brain, the sense of sight, though not essential to life, is undoubtedly the most important. It is estimated eighty per cent of all we learn of the world about us is reported to the brain through the eyes, *but under normal conditions we are never conscious of our eyes, or of the fact that the physical force which we term light is acting upon the retina.*[2] If the light is too bright we are conscious of pain, or if the light is too dim we are conscious of annoyance, or strain, at our inability to see; and if the eyes themselves are not functioning properly we are conscious of the various sensations commonly described as "eye strain" and headaches; but in the normal response to normal visual stimulation we are conscious only of the object in space and the mind is entirely occupied with the significance of that object relative to our own well being. To become conscious of one's eyes during the process of "seeing" the world about us in itself indicative of other than normal conditions.

It is a matter of common optometric knowledge that we visually concentrate on but one object at a time, and that in any normal use of the eyes this "point of fixation" is constantly changing. The object which is imaged upon the fovea centralis is, normally, the object which engages the mind. Normally not more than three seconds, usually not more than one-fourth of a second is required for the mind to fully interpret a motionless, unchanging macular image. Therefore the eyes must be directed from point to point almost unceasingly, and obviously, if one is not to become conscious of the eye movements themselves, and the mind is to be left free to consider the objects in space, *the movement of the eyes in normal use must be directed without conscious effort, that is, automaticity of ocular control.*

The perfectly normal pair of human eyes function as a unit so precisely that the mind is never conscious of them.[3] They move constantly throughout the normal waking day, without fatigue. Yet if the eyes be closed, they assume a position of rest, and remain practically motionless. If, while

closed, the eyes are directed to the right, then to the left, then up, then down, and so on; obviously the movement is directed by thought, and it is significant that weariness soon results from such purely volitional movement. The extent of the movement is reported to the brain so that the mind becomes conscious of "the feel of the muscles," something that never occurs under normal circumstances.

Under normal circumstances the normal pair of eyes never causes awareness of diplopia, yet holding one's finger a few inches from the nose and looking beyond it will demonstrate that diplopia constantly exists. Diplopia of an object with which the mind is engaged is almost intolerable and the experimenter will experience a conscious desire to "fix" the finger binocularly during the above test.

The intolerance of diplopia is readily explained by the fact that if the mind is to correctly interpret the external world, the reports of that world brought in by the sense of sight must conform to the reports brought in by the sense of touch. If we touched but one object, though seeing two, we would be constantly confused. Normally we "feel" with one hand at a time, and are perfectly aware which hand is making the investigation. Normally we see with both eyes at the same time, and if one eye is excluded from the visual act, we are **not** perfectly aware which eye continues the investigation. For example, if a subject having normal eyes is asked to watch a red light in a darkened room while a ruby glass is held before one eye, and at the same time a red-free glass is placed before the other eye the subject will continue to see the red light, but the eye behind the red-free glass will be excluded from the visual act, and the subject will be unable to say with which eye he is seeing the light until he covers one eye or the other. On the other hand, patients who have anisometropia, or heterophoria, or heterotropia, frequently—almost usually—are able to say correctly which eye sees the light although both remain uncovered. The awareness of the seeing eye seems to be in proportion to the extent of the ametropia or heterophoria.

Until a child is three months of age, the eyes move more or less independently of each other,[4] coordination is not perfect until the end of the sixth year. The ability to maintain single binocular vision is acquired in each individual, just as the ability to maintain an upright position and to walk is acquired. If, during this period of development, something interferes with its perfect completion, so that single binocular vision is not maintained automatically as it is in orthophoria, it becomes necessary for the patient to maintain single binocular vision by an effort of will comparable to the effort required to move the eyes when the lids are closed; and the patient complains of "pulling sensations," aches, pains and headaches very like the sensations experienced when rotation of the closed eyes is continued to the point of fatigue.

It is common knowledge that the greater conscious effort aroused by any muscular movement, the more awkward and tiresome that movement becomes. So, if the automatic adjustment for single binocular vision is not perfect and diplopia is frequent enough to be confusing, the patient learns to be aware of the image of one eye to the exclusion of the other, just as we are aware of one hand to the exclusion of the other; and if vision with one eye is more efficient than with the other, the inefficient eye is suppressed and gradually becomes less efficient from lack of dependence thereupon, this condition is known as amblyopia exanopsia.

Case histories reveal complete exclusion of one eye, even temporarily, during the first three or four years of life, frequently solves the diplopia problem. This solution leads the individual to develop the faculty of suppression, rather than the faculty of fusion; so that suppression leading to amblyopia becomes the cause of heterotropia or heterophoria rather than the result. In fact, Maddox states, "perfect orthophoria (by which I mean orthophoria maintained if one eye be excluded for a week) is not found in one of a thousand."[5]

Perfect development of single binocular vision is the mental acceptance of the two retinal stimulations, and if one eye is stimulated by "red" light while the other is stimulated by its compliment, "signal green" the mental conception is "whitish"—"a blending of

the two to form a distinct third color." This mental fusion is something more than mere mechanical matching, and is essential to comfortable vision. For, after all, we see with the mind through the eye. Furthermore, visual comfort demands that the mind be left free to consider the object "seen" without being burdened with consciousness of the organic means employed. Light from the object in space stimulates the retina. The message is conveyed to the brain. Nerve impulses travel from the brain to the muscles, so that the object is clearly imaged upon the macula. Then and normally, not until then, does consciousness awaken to record the color, form, distance and significance of the object.

To properly understand and develop the control of ocular muscles, it is not sufficient to consider merely the muscles themselves. Neither is it sufficient to include the motor centers of the brain and nothing more. It is even more essential that the means of stimulating to motor centers be understood, for once stimulated the motor centers proceed to excite the muscles no matter whence came the stimulation.

Normal eyes provide single binocular vision without awakening consciousness; sub-normal eyes may provide single binocular vision more or less aided by consciousness; and some sub-normal eyes do not provide single binocular vision at all. To develop either of the latter to normal, will require comprehensive knowledge of the entire process involved from retinal stimulation to muscular adjustment.

[Future chapters of this article will present an outline of the tissues involved beginning with the retina (knowledge of the dioptric system being assumed) and facts worthy of consideration in any attempt to develop the human eye to maximum efficiency through optometric means.]—Editor, American Journal of Optometry.

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"BURYING THE PLUS"

Oscar L. McColloch, Opt. D.

Holyoke, Mass.

On September 14, 1926, there came to my office a woman with her daughter who was 13 years of age. The complaint summed itself up in the fact that the child was continually rubbing her eyes and was nervous especially during the months in which school was in session. This condition had seemed to have become aggravated since the opening of school in the present year.

A careful refraction revealed the following: The ophthalmometer (Universal) for the O. D. reading was 44.00 ax 180; 44.75 ax 90 while the O. S. was 44.00 ax 165; 44.75 ax 75. The phoria test for infinity by the Savage method gave 4$^{\Delta}$ Exophoria without lenses while at the near point by the same method there was 8$^{\Delta}$ of Exophoria. Subjectively the final prescription was O. D. +0.50 Sph. $\bigcirc$ +0.25 Cyl ax 90. O. S. was +0.50 Sph. $\bigcirc$ +0.25 Cyl. ax 75. This was obtained in the regular manner with Snellen letters and checked by means of the cross cylinder test. Either test gave the same result. The skiascope verified this prescription for distance but there was plainly at least 2.00 D. more of plus for the near point. This in turn was brought almost in exact agreement by means of the cross cylinder test at 33cm. Visual acuity with

or without distance correction was 20/20 for either eye.

As is my usual procedure I then placed the patient before the Kratometer and in using the F-L card I found a convergence insufficiency of 5Δ at 33cm. Adduction was only 6Δ with reversion to fusion at 1Δ. Abduction was 18Δ with reversion at 8Δ at the same 33cm. On the basis of this and the subsequent information from the mother that at times when the girl was extremely tired or nervous the O. S. would turn out momentarily I knew that the case was one of a real convergence insufficiency and that something must be done for that in addition to any refractive error. I then tried to cut the plus but could not and did succeed in adding 1Δ prisms over each eye base out. Before adding the prisms I took the phorias and found them the same with the distance prescription worn as without. The addition of the +2.00 for the near however jumped the Exophoria up to 12Δ so I knew that this would never work satisfactorily. The final prescription given was O. D. +0.50 Sph. ⊂ +0.25 Cyl. ax 90 ⊂ 1Δ base out. O. S. +0.50 Sph. ⊂ 0.25 Cyl. ax 75 ⊂ 1Δ base out. These were given for constant use with instructions to return in six months.

On March 19th, 1927, the patient came in and the following was obtained: The spheres could be removed and was proven with the skiascope, cross cylinder test and subjectively. The Kratometer showed perfect fusion with the normal amount of prism for the F-L card and the Adduction had increased to 10Δ. Reversion to fusion was obtained at 4Δ. The abduction had not changed. The cross cylinder test at the near point of 33cm. only revealed +1.50 Sph. added to the distance prescription and if the convergence was relaxed back with base in prism it still remained the same. So in six months we had succeeded in burying 1 full diopter of plus, much to the patient's benefit. The prescription given at this time was O. D. +0.25 Cyl. ax 90 ⊂ 1Δ base out. O. S. +0.25 Cyl. ax 75 ⊂ 1Δ base out. These were ordered for constant wear with instructions to return in another six months.

On September 29th, 1927, the same patient came in and was considerably improved as to her nervousness as is evidenced from the fact that she came alone and was not worried about having her eyes examined as she had been at previous times.

The phoria for distance was now 3Δ Exophoria and 7Δ Exophoria for 33cm. These were taken with the prescription in place but not the prisms base out. Otherwise it could not have been compared with the previous phoria tests accurately. The skiascope now showed an extra +1.00 Sph. at the near point of 33cm and again this was verified with the cross cylinder test. There was no change in the distance prescription. The Kratometer showed perfect fusion of the F-L card and the Adduction had increased to 18Δ with reversion at 16Δ. The Abduction had reduced to 16Δ with reversion at 12Δ. The patient was instructed to wear the same prescription for another six months and then report.

To sum up the ifs and ands of this case would take considerable time but I submit that unless this case had been handled in a manner so as to bury the plus instead of bringing it out the patient would very likely have progressed to the point where she would have lost binocular vision and probably with one eye highly exotropic. It also shows the value of the Kratometer as a diagnostic instrument. If it had been possible to have had the patient come in for daily training I believe the same thing could have been accomplished in a much shorter time but as it is in another six months there won't be any latent hyperopia and the girl will have a well functioning pair of eyes to face her life's work with instead of a disfigured countenance and the fear of becoming blind.

DENTISTRY AND OPTOMETRY—HOW THEY ARE ANATOMICALLY, PHYSIOLOGICALLY AND VERY PRACTICALLY RELATED

David Levinson, Opt. D., and B. B. Benazzi, D. D. S.,
Danville, Va.

There is good reason for the Dentist and Optometrist to retain at least a conversant knowledge of the connection between the teeth and the eyes, for, in some instances, absolute cooperation between the two professions is necessary, out of justice to a patient. For the most part, however, the scales balance in favor of the Dentist, for dental diseases are more frequently thought to be ocular disturbances than are ocular disturbances attributed to the teeth, simply because an individual is more prone to expect headaches, contracted visual fields and other ailments to be due to his eyes, rather than to his teeth. Still, when once a patient is referred by an Optometrist, the Dentist must recall the coordinated existence between the teeth and the eyes, to know where to intelligently locate the trouble, on the strength of the initial information the patient has given the Optometrist.

Even though it may be desired to include only the more general and broader items allied with the subject under discussion, it is almost impossible to introduce practical considerations without going into the anatomical and physiological aspects of the matter. With this thought in mind, the approach will first be along these lines.

The skull, for practical purposes, is divided into the cranium and the lower jaw. The cerebral portion of the cranium houses and offers protection to the brain, while on the visceral portion are found the openings of the mouth and nose. Between the cerebral cranium and visceral cranium are located the orbital cavities containing the eyes. The orbital cavities are pyramidal in shape, quadrilateral, and are situated in what might be termed the upper and anterior part of the face, the eyes being located in the anterior part of the cavities.

The two superior maxillary bones, right and left, form the upper jaw and assist in forming the roof of the mouth, floor and outer wall of the nasal fossae and the floor of the orbit. Within the soft parts of the maxilla (the alveolar part being the spongiest) are canals and channels, wherein are received nerves, vessels and sockets for the teeth. By means of the periosteum—the membranous covering—vessels give nourishment to the bone.

The lower jaw, or inferior maxilla, is constructed so as to also contain vessels and canals. Sockets are also present for the lower teeth roots and nourishment is maintained through the periosteum, there also being muscle attachment, as in the case with the superior maxillae.

Thus it can be seen, from the outset, that even anatomically there is a connection between the basic structures which go to make up the oral mechanism, and those from which are fashioned the ocular mechanism, while we observe an even more potent relationship, as we delve into the subject of the cranial nerves and applied anatomy.

Without drawing the picture that is repeatedly used to express the analogy that exists between the nervous system of the body and our telephone system of today, mention is made of the well-known fact that there are 12 pairs of cranial nerves. In this particular study we have on hand, we are more directly concerned with the 3rd, 4th, 5th and 6th cranial nerves. Briefly, the functions of the nerves we are interested in (with detailed reference to the 5th nerve) are described as follows:

The **third** nerve (oculomotor) supplies all the muscles of the orbits except the superior oblique and external rectus. In connection with the ciliary ganglion, the third nerve also supplies the sphincter of the iris and the ciliary muscle. There is a connection between the nucleus of the third nerve and the fibres of the 6th nerve, which bespeaks intimate relationship between the nerve supplying the muscles of the

orbit and ciliary muscle and the nerve supplying the external rectus.

The **fourth** nerve (trochlear) supplies but one muscle—the superior oblique. Paralysis of this nerve prevents turning of the eye downward and outward.

The **sixth** nerve (abducens) supplies the external rectus muscle.

The **fifth** or trifacial nerve is the largest cranial nerve and seems to have a more direct bearing on the interrelation between the eyes and the teeth than any of the other cranial nerves. The fifth nerve has three large branches—the ophthalmic, superior maxillary, and the inferior maxillary.

The ophthalmic branch of the fifth nerve supplies branches to the cornea, ciliary muscles and iris, to the lacrimal gland, etc.

The superior maxillary nerve has wide distribution, to the membrane covering the brain, etc.

The posterior dental branches give off twigs to the gums and parts of the mucous membrane of the cheek. They then enter the upper jaw. Here they touch with the middle dental nerve and give three twigs to each molar tooth.

The middle superior dental branch supply the incisor and canine teeth.

The palpebral branches of the superior maxillary division of the fifth nerve supply the skin and conjunctiva of the lower lid.

From Meckel's ganglion jump four groups of branches which supply the superior tarsal, inferior tarsal muscle and the muscle of Muller.

The inferior maxillary, the third division of the fifth cranial nerve, distributes branches to the teeth and gums of the lower jaw, etc.

Now, with the subjects of anatomy and physiology touched upon, it is meet to turn to the practical aspect of the connections we have seen to exist between the teeth and the eyes, and discuss just wherein this relationship is important in routine work, as demonstrated by cases that have been reported and given publicity, by both Optometrists and Dentists.

In the case of the fifth nerve, for example, it can easily be seen that because of its wide distribution and intricate intertwining with the eyes, any infection or trouble with the teeth or attendant structures, may, in turn, set up reflex pain in an area that would appear to be remote from the teeth—which, as likely as anything else, might cause a person to believe he is suffering from ocular troubles, while the real cause of his worries are due to some infection or disease that is peculiarly present in the teeth.

Reflex dental irritation has been known to cause ptosis. Besides this, we have mention of cases where third nerve paralysis has caused the loss of accommodative response, etc.

A lesion of the fifth nerve has been known to cause inflammation of the cornea.

Muscular anomalies have also been known to result from reflex dental irritation.

And so we could go on, citing many more cases that have been set down as examples to serve posterity as the years roll on. And, these cases have and are serving their purpose. But, it is signally distressing to note how both the Optometrist and Dentist have failed to realize more strongly the dire necessity for, as it has been put, the retention of at least a conversant knowledge of the relationship between the teeth and the eyes. A patient then might be assured of positive and correct attention and advice, whenever the need for such attention presented itself, which may seem seldom—only because of the tendency to let slip certain points on anatomy and physiology that would not be hard to remember if once the importance of their retention was realized. With the erasing of the facts that would serve the public well not only goes a patient half-treated but along with it flits that very mutual interest, that very solder, that would serve to link a chain—with Dentistry on one end and Optometry on the other.

OCULAR MYOLOGY

J. W. Parker, Opt. D.

Kansas City, Mo.

Part II.

Method of Muscle Testing.

In making the various muscle tests, necessary to a correct diagnosis, the phoria tests for both distance and reading should be made first. The reason for this is that the duction tests often "cramp" the muscles and if followed by the phoria tests a false condition will be shown.

Phoria tests are based on the principle of either distorting the image in one eye, or, throwing the images in different parts of the macular field. The object sought, is to allow the muscles to seek a point of rest. In doing this the visual lines are deviated from their proper position provided a heterophoria exists. The amount of the deviation is measured by the prism required to line up or fuse the images. It is very noticeable that those who have only a smattering of knowledge along this line are apt to place too much stress on the value of phoria tests. Orthophoria is to be desired, of course, but some of the hardest cases we have to handle are practically orthophoric.

The Distance Test: The distance test can be made with either the maddox rod or with the double prism. In either case one should form the habit of always placing the device used over the same eye for each patient. This will reduce the possibility of making an error. With the maddox rod over the right eye the streak will appear at the right of spot light if the eye turns in. (Esophoria) If the streak is seen at left the eye is turning out. (Exophoria) If the double prism is used the base line should set perfectly horizontal. (For lateral tests.) If the double prism is used one must remember the top and bottom images belong to the eye over which the prism is placed.

Reading Point Test: The reading point test can be made by use of the double prism in the same manner as used for distance. A better method is to draw a horizontal line lengthwise of a card approximately 3x7 inches in size. Mark the center of line "O" and set off 15 spaces each, right and left of center, spaces to be 3⅓ millimeters apart. Starting about ¼ inch above the zero mark draw an arrow ¾ of an inch long and pointing up. The card is to be held at 13 inches from the eyes. An 8 degree prism, base down before right eye will cause diplopia. The spaces should be numbered one to fifteen in each direction from centre. The figures at right denote exophoria and those at left esophoria. The deviation is indicated by the figure to which the lower arrow points. This test should be made with full correction in place. If a presbyope, with the addition on.

A strict record should be made of all muscle tests and a correct diagnosis can be made only through a consideration of all of them; the relation of one to another.

Duction Tests: The duction tests are made with prisms, apex over muscle to be measured. Having the patient look at a spotlight placed 20 feet from the eyes, we measure the adduction by finding the strongest prism, base out, with which the patient can fuse the images. The abduction is found by placing the base in. Sursumduction by placing the base up or down. It makes little difference whether the prismatic power is applied wholly to one eye or divided between the two. The exception may be where a strong prism throws the image so far out of the true macular field stimulus to fusion is lost. It is, so far, impossible to measure the strength of the muscles of either eye independent of the other. While it is true that one eye fixes and remains stationary while the other swings into position, the power required to hold the fixing eye

is equivalent to that required for converging the mate.

At this point it may be well to mention that while heterophorias are affected by muscle exercises the phoric tests give us little or no clue as to the ductions. Neither will a duction test tell us what to expect from the phoria test. At first thought, one might expect to find esophoria where the adductive power is above normal, or, exophoria where the abduction was high. It must be borne in mind, however, that before making the phoria test at 20 feet we first take all possible precautions to see that all muscles, intrinsic and extrinsic, are at rest. This being accomplished, the strength of the muscles could have no bearing on the findings. Could we be positive that all errors of refraction were fully corrected, that none of the recti muscles were suffering from a cramp or spasm, and that the correction before the eyes was perfectly centered, then we could assume any deviation as being due to a structural defect.

Tests for Slow Reaction: Place base out, the strongest prism the patient can overcome or fuse. After the images have been fused tell the patient to say "Now" as soon as single vision is obtained after the prism is removed. Those of you who have never used this test will be surprised in many instances at the lapse of time required. Under normal conditions the eyes should return to the point of rest so quickly the patient would not have time to speak. When they fail to do so, the trouble may be, a naturally slow reaction, a cramp or spasm, a "stiffness" of the muscles due to lack of exercise, or, as frequently happens, to mental lassitude. I have found several cases in which the patient had acquired the habit of always turning the head instead of rolling the eyes. This practice is almost certain to eventually bring on vertigo when the patient passes fifty. Whatever the cause, systematic exercise will usually effect a cure. The possible exception is the mental cases. It is well to remember that an active, alert mind tends to cause esophoria while the inactive one tends toward exophoria and slow reactions. Every refractionist should, therefore, be something of a psychologist. To be able to show a friendly interest in our patients, to sympathize or to jolly, as the occasion requires, is an art not to be despised.

Stereoscopic Tests: A small percentage of all muscle cases show decidedly imperfect macular fields. In one or both eyes the macula is dotted with minute areas in which vision is partially or wholly lacking. A blind spot in the macula is called a scotoma. If vision is entirely lacking it is called scotoma absolute. In the majority of cases, however, the vision in these spots is spasmodic or below normal. As a rule the vision, by ordinary tests, is good. If both eyes are in use the image falling on a scotoma in one eye falls on a perfect spot in the mate. If one eye alone is tested a slight shifting brings the image on a clear field and again vision is good. To detect the presence of these minute blind spots we must make use of the stereoscopic principle. In this test both eyes are brought into use at the same time and held steady. Let us imagine a stereoscopic test card having the same reading matter on either end. In the word "this" the right-hand letters are complete. In the left the cross stroke for the t and the dot for the i is missing. If the macular field in both eyes happens to be perfect the letters appear normal. If, however, the cross stroke or the dot for the i happened to fall on a scotoma in the right eye the letters would be incomplete. Special cards for making these tests are included in the sets for stereoscopic exercises and can be used in the ordinary stereoscope.

Up to the presbyopic age the patient may have a poor fusion stimulus which is compensated for by that from the accommodation. With the first addition for reading, however, the accommodative stimulus is weakened and trouble may ensue. As the patient grows older the addition is strengthened until, finally, the stimulus for convergence must come wholly from the fusion desire. Numerous experiments have shown the fusion stimulus to be regulated largely by the size of the image, colors, and by the perfection of the macular field. In passing it might be proper to state that the campimeter, which is in reality a stereoscope, is an excellent instrument for testing the macular field. While perhaps less than ten per cent of our pa-

tients are affected with blind spots to an extent causing trouble it is necessary to conscientious work that we understand diagnosing and treating such cases.

A further use for the stereoscope is in testing the sense of perspective or true stereoscopic vision. Certain cards, designed especially for the purpose, contain pictures of dish pans, waste baskets, etc. Looked at with the naked eye these pictures have no depth, being simply a series of concentric circles. Through the stereoscope one should get a sense of depth or relief in viewing these pictures. It occasionally happens the pictures appear, through the prisms, exactly as with the naked eye. The sense of perspective is missing and this may cause vertigo and also weaken the convergence.

Muscular Treatment: It often happens with the novice that a case of weak convergence responds very rapidly to prism exercise and after three or four treatments are given the patient is discharged. In a few weeks he returns with the complaint of his eyes becoming very tired after reading thirty minutes or so. What is wrong? Possibly, of course, the lenses may be wrong. Actually, in the majority of cases, the exercises developed a strong temporary adduction but failed to build up the necessary reserve. It is just another illustration of the principle illustrated by the saying about the oak and the mushroom. That which can be quickly grown or constructed is usually short lived.

When we place a prism over an eye we are training the nerve supplying the muscle under the apex to supply more energy to that muscle. Incidentally, we strengthen the muscle intrinsically. When we realize, however, the small amount of energy required to move the eyeball, under normal conditions, we can see the improbability of a rectus muscle being actually too weak from a structural standpoint. Should conditions be such that the antagonistic muscle is either cramped or being over-energized the apparently weak muscle is having to perform a much harder task than turning an eyeball which is perfectly free to move in the desired direction. It thus happens we often are required to relax a muscle as well as to strengthen the antagonistic.

In starting prism exercises one should always begin with low powers and acquire the knack of timing the operation so that the periods of contraction and rest are about equal. The first efforts should be toward establishing a habit, rather than developing strength. A prism, one-third of the total amount the patient can fuse, will not increase the dynamic strength of the muscle to any appreciable amount, even if used many times. It will, however, train the nervous function to respond quickly. Once this habit is firmly established we can then proceed to develop the strength and what is more important, the vitality or sustaining power. Measuring the temporary strength of a muscle is a simple matter. Estimating its power of endurance is much harder. We can form a rather definite idea by watching the point of fatigue while giving the exercise. After we have commenced developing the strength of a muscle we should ask the patient to say "Now" at the instant the lights fuse. So long as the interval between placing the prism in position and the patient's response becomes shorter he is benefiting by the exercise. When the interval begins to lengthen we have passed the point of fatigue and the exercise should be discontinued for the time being. Fatigue is also indicated when, for instance, the patient fuses 20, base out, and a few minutes later stalls on 18. Toward the completion last two or three treatments we can test the vitality by leaving a strong prism insitu and having the patient see how long it takes for fusion to break.

Stereoscopic Exercises: Adduction hinges largely on perfection of the fusion faculty or stimulus. This, in turn, is largely dependent upon the perfection of the macula. Blind spots in the macular field, as found by the stereoscopic tests mentioned previously, may be due to a large variety of causes. Amongst these are syphilis, nephritis, alcoholism, anemia, and the effects of toxines from various causes. Whatever the cause, it appears from actual experiments, that stereoscopic exercises have a beneficial effect. If the original cause can be determined and removed that is, of course, the logical first step. Full adductive power with ability to sustain it cannot be

hoped for until the macular field of both eyes is in good condition.

Miscellaneous Exercises: In addition to the stereoscope and prism exercises the refractionists have been in the habit of having the patient take "home treatments" such as the pencil exercise, wearing prisms in grab fronts, etc. Years ago a great many, oculists especially, would have their patients walk toward a candle, keeping their eyes on the flame, while wearing prisms. Those who pin their faith in such methods are lacking in the fundamentals of myology. Not that the pencil exercise is a complete failure but because the results obtained are necessarily limited. Almost any kind of exercise, such as rolling the eyes, etc., help to increase the flexibility of the muscles, to train the nerves to act more quickly and to keep down the "drop back" between treatments. One point must be constantly kept in mind, however, and that is: The amount of energy which can be called to a muscle is always regulated by the need for the action. It takes but little power to move the eyes from one position to another unless some form of "resistance" is interposed. A prism base out calls for additional energy to converge the eyes to a given point, hence, the tendency for the nucleus to increase the amount. Approximately, the necessary amount to accomplish the convergence to a given point, plus the amount required to neutralize the prism—and no more, will be sent out. As the prismatic power is increased the amount of energy sent to the muscle will be increased within certain limits. If too much of a jump is made between powers no effort will be made to neutralize the prism. There are two reasons for this: First, the false image is thrown so far from the sensitive center of the macula the stimulation is lost because of a lack of sensibility. Second, we sub-consciously refuse to attempt the apparently impossible. If it requires a conscious effort for the patient to neutralize a ten degree prism, base out, he will not attempt a twenty. If the ten is replaced with a twelve he may make the attempt and succeed. By degrees he will reach the twenty or more.

Records: Ocular myology is one phase of optometry in which slip-shod methods spell certain failure. A full record should be made of all preliminary tests and the effects of every treatment recorded. Watching these records closely is an education in itself. From these records we are able to judge the effects of a change in lenses, the value of the various methods of treatment and last but not least, we are enabled to show the patient the exact rate of progress.

NOTE ON THE RELATIVE COMFORT IN READING BY ARTIFICIAL DAYLIGHT AND UNMODIFIED GAS-FILLED TUNGSTEN LAMPS

Irwin G. Priest.
Bureau of Standards,
Washington, D. C.

From the
Journal of the Optical Society of America.

Experiment.

Some months ago Hon. W. A. Ayres requested of the Bureau of Standards information relative to artificial daylight for reading.[1] In making this request, Mr. Ayres stated that he could read for long periods by natural daylight without discomfort or serious after effects. On the other hand, he said that reading for half an hour by ordinary electric incandescent light caused him great pain and resulted in headache on the following day.

As an experiment, an artificial daylight unit, consisting of a 600-watt gas-filled lamp (Mazda C), a blue filter, and suitable reflector and housing, was installed in Mr. Ayres' home. The ap-

parent color temperature[2] was about 9,000° K; and the illumination on the reading page was about 8 or 10 foot-candles. The experiment consisted in having the subject do his usual reading of black print on white paper and report the effects. This installation gave great satisfaction, Mr. Ayres reporting that he could now read with comfort and without bad after effects.

A smaller artificial daylight lamp (color temperature about 8,000° K) was then tried, giving only about 3 or 4 foot-candles. This proved woefully unsatisfactory. It was tried thoroughly one evening and the next day's after effects were such that the subject of the experiment would have nothing more to do with it.

This experiment, of course, suggested that, after all, it might be merely sufficient illumination (foot-candles) and not quality (color) which determined the reader's comfort. Therefore, another incandescent lamp (Mazda C, color temperature about 2,800-3,000° K) was provided, to give an illumination of something over 10 foot-candles (perhaps 15) and Mr. Ayres was requested to compare this with the first mentioned daylight unit (which gave slightly less illumination, about 10 foot-candles) and report his preference. His verdict was emphatically in favor of the artificial daylight. He insists and is very confident that the relatively blue color is the thing essential to his comfort, and that no amount of illumination of the color of the ordinary unmodified incandescent lamp would be satisfactory.

Discussion.

This account is submitted merely as a narrative of what happened in the experiment. The result is suggestive rather than conclusive in any general sense. It would be rash to draw from this single experiment any general conclusions as to the superiority of artificial daylight for evening reading. What is proven by the experiment is that one individual reports himself comfortable and satisfied with artificial daylight and very uncomfortable and dissatisfied with ordinary incandescent light even when the illumination by the latter is as great or greater. As to the cause or basis of this preference (physiological or psychological) we have no certain information.

Since the above experiment was concluded (March, 1927), previous data and opinions having a direct and important bearing on it have come to my attention. It appears worth while to summarize them as follows:

(1) Ferree and Rand[3] have shown that acuity, speed of discrimination, and power to sustain acuity are all notably higher with artificial daylight than with the unmodified light of the gas-filled tungsten lamp. The difference in power to sustain acuity is particularly significant. "For example, the ratio time clear to time blurred for the daylight glass was 71; for the tungsten lamp, 35; and for the yellow of the spectrum, 29."[4] Although Ferree and Rand do not give a definite specification of their artificial daylight, it is probably fair to assume that it was between sunlight and blue sky. It does not seem to be clearly stated in the paper that the illuminations were equal; but Dr. Rand advises me that this was the case.[5] Moreover, Ferree and Rand in extensive experiments have found natural daylight, for equal illumination, superior to incandescent lamp light in tests of acuity and power to sustain acuity as well as in speed of vision. They also find ocular fatigue less under natural daylight.[6] Dr. Rand has also informed me[7] that they have been able to duplicate under artificial daylight the speed of discrimination found under natural daylight.

(2) In tests made several years ago by the Nela Lighting Research Laboratory, a majority of observers preferred the relatively bluish light of the so-called "daylight lamps" to the unmodified light of the gas-filled tungsten lamp for reading, even though the illumination was only two-thirds of that afforded by the unmodified gas-filled tungsten.[8] The lamps referred to probably gave light about the quality of that supplied by the ordinary carbon arc, i.e., bluer than unmodified gas-filled tungsten lamps but still quite yellow relative to natural daylight.

(3) Dr. Rand[9] offers the following comment after reading the manuscript of the above report on Mr. Ayres' case: "I think, however, that there are some people who are more sensitive to the quality of artificial light

than others. While my acuity, speed, etc., are higher under daylight, natural and artificial, than under Mazda quality, I do not experience discomfort from ordinary work under the latter. There are plenty of people of my acquaintance, however, whose testimony is that their eyes suffer under Mazda light and are comfortable under artificial daylight. I think this is not merely a subjective phenomenon with them."

(4) Mr. Norman Macbeth tells me[10] that he has unpublished letters from more than one hundred people indicating that they prefer artificial daylight to ordinary unmodified incandescent light for reading. There is considerable difficulty in deciding how to treat such "testimonials"; and the critical investigator may well be inclined to ascribe the alleged benefits to "illusion." Nevertheless, they can not be ignored. Quite aside from any reason for it, the primary matter of interest is that numbers of readers do prefer daylight. If they find comfort in it, it is a good thing for them even if others are unable to understand their preference. (Undoubtedly some people dislike the artificial daylight for one reason or another.)

(5) Data by Carlson[11] indicate a slightly higher acuity for daylight than for gas-filled tungsten at illuminations below twenty foot-candles. Curiously enough the tungsten seems to be superior at higher illuminations.

(6) Dr. Louis Bell,[12] in discussing the data of Ferree and Rand, suggests an hypothesis which may account for the superior power to sustain acuity with a daylight illumination: "It seems to me that here we have entirely a different situation entering, which determines the factors of sustained acuity, and that is, the effect of the various wave lengths on the photo-chemical substance, whatever it is, which actually determines vision."

(7) The experimental data of Ferree and Rand on increased acuity with daylight seem to be inconsistent both with a priori conclusions based on the fact that the retinal image must be less sharp with such light than with light of a more restricted spectral range, and also with experimental data showing that acuity is actually improved by screening the gas-filled tungsten lamp with a very selective yellow filter.[13] It may be that effective visual acuity is the resultant of two opposed effects, viz., (a) the physical definition of the retinal image is improved by lack of heterogeneity in the wave length composition of the light; (b) the physiological functioning is improved by approximation to daylight distribution and impaired by approximation to homogeneity (Bell's hypothesis). If these two principles be admitted, a reconciliation of the findings of Ferree and Rand on one hand and Luckiesh and Moss on the other, by different adjustments of these effects, is conceivable.

It should also be emphasized that the data of Luckiesh and Moss just cited, tell us nothing about fatigue and power to sustain acuity. It may well be that increased acuity with light of restricted wave length range is secured at the expense of more rapid fatigue and decreased power to sustain acuity.[14] With regard to the power to sustain acuity, the findings of Ferree and Rand in favor of daylight (either natural or artificial) appear definite and significant. On these points there seems to be no other evidence either confirming or controverting them. In a subject so difficult of experimental attack, further investigation by independent workers would be of interest; but, in default of this, it seems reasonable to accept the conclusions of Ferree and Rand.

It will be noted that the previous data indicate the reasonableness of our findings in the present case. Since it has been established by Ferree and Rand that power to sustain acuity is notably greater for daylight (both natural and artificial) than for the unmodified light from incandescent lamps, one might well expect that comfort in prolonged reading would be enhanced. The a priori argument of natural adaptation of the organism to the environment in which it has evolved may also be cited in favor of daylight. I have not, however, found any published account of a case in which such marked and pronounced benefit was experienced as has been testified to by Mr. Ayres. Dr. Rand herself, says, as noted above, that while her own acuity, speed, etc., are higher under daylight, she does not experience discomfort from ordinary

work under common incandescent illumination. Mr. Commery speaks of the subjects of the Nela experiments only as "preferring" a light bluer than unmodified tungsten; no mention is made of discomfort and pain incident to reading by ordinary incandescent light being relieved by the use of this bluer light. Doubtless there are very great differences among individuals. Mr. Ayres states that his great difficulty arose from using his eyes too soon after a long illness some fifteen years ago. The thought suggests itself that daylight is really a superior illuminant for all individuals; but the shortcomings of ordinary artificial incandescent illumination become quite painfully manifest only in the case of those whose vision is impaired by pathological conditions, probably in the retina. This however, is merely a suggestion, not a conclusion.

At first thought, the well known fact that many persons prefer the very yellow warm glow of candle light to the relatively blue electric incandescent light for evening illumination is seemingly quite inconsistent with the data given above. I believe, however, that there is no necessary contradiction in this. This preference is probably due largely to poetic, artistic and sentimental association rather than to comfort in prolonged work requiring sustained high visual acuity. From the artistic point of view, daylight in the evening is an incongruity not readily overlooked. A beam of sunlight projected into the cozy living room in the winter evening, or onto the hearthstone in front of the glowing embers at midnight, is a jarring note. Doubtless, for many purposes, man finds sweet relief from daylight cares in the genial glow of fireside and candle light; but there appears to be no evidence that any one can read with greater comfort by light of the quality of the candle flame. In fact there always has been a widespread layman's opinion that reading by candle light was "hard on the eyes." (Doubtless much of the difficulty has been due to insufficient illumination. However, it now seems reasonable to ascribe some of it to the quality as well as to the quantity of light.) Until it is definitely shown that some one has higher sustained acuity and suffers less fatigue under candle light than by daylight we may well assume that this preference for yellow illumination is merely a matter of the seeming fitness of things pertaining to night rather than day, and has no bearing on the question of the best illuminant for reading.

Further experiments comparing, in various ways and under carefully controlled conditions, the relative merits of daylight and yellow incandescent light for reading would be of considerable interest. If many people find the benefit experienced by Mr. Ayres, it would seem that there is a wide field of usefulness for artificial daylight in relieving human suffering.

Appendix.

[The following references are appended for the convenience of readers who may not be fully informed as to the nature of artificial daylight and the means of producing it.]

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1. Letter of January 10, 1927.
2. Color temperatures between 8,000 and 9,000° K correspond to light from a hazy pale blue sky. Cf. J. O. S. A. & R. S. I., 7, p. 1184; Dec. 1923.
3. Trans. I. E. S. 17, pp. 71, 80, and 82; 1922.
4. Trans. I. E. S. 17, p. 85.
5. Letter of May 22, 1927.
6. Trans. I. E. S. 21, pp. 594, 597; July, 1926.
7. Letter of May 22, 1927.
8. Luckiesh: Trans. I. E. S. 19, p. 448; 1924. Commery. Trans. I. E. S. 21, p. 612; 1926.
9. Letter of May 22, 1927.
10. Oral Statement, April 6, 1927.
11. Trans. I. E. S. 21, p. 621.
12. Trans. I. E. S. 17, pp. 87-89.
13. Luckiesh and Moss: "Visual Acuity with Shortened Spectrum," J. O. S. A. & R. S. I., 10, pp. 275-281; 1925.
14. This is the opinion advanced by Mr. Norman Macbeth in conversation and correspondence with the writer.

TWO CASES OF CONVERGENCE INSUFFICIENCY

R. G. Colberg, Opt. D.
Aberdeen, South Dakota

Case one. Patient, male, age 24. Occupation, clerical worker. At the time of his first visit he was wearing the following correction: O. D. +0.25 D. Sph. O. S. +0.75 D. Sph. ⊃ +0.25 D. Cyl. axis 75. He was suffering from fatigue and artificial light was extremely trying, making it almost impossible to do any near point work particularly after sundown. After a thorough examination I prescribed the following correction: O. D. +2.00 D. Cyl. axis 90. O. S. +0.25 D. Sph. ⊃ +0.75 D. Cyl. axis 75. This was given him for constant wear. Inasmuch as his adduction was but from 1 to 3 prism diopters, and his ability to fuse seemed, at times at least, to be even less than this I also prescribed treatments to increase if possible, his adduction. It was very difficult to treat this case but after some time his ability to fuse increased and when discharged he was able to fuse and hold 65 prism dioptres with the Kratometer. In about a year he returned saying that the old trouble had returned and upon reexamination I found the convergence reserve again low and again prescribed treatment which in a few days brought his adduction to the high point. This gave him comfort and he now returns every ninety days for post-refractions. He is seeing and feeling much better than ever before and his asthenopia has entirely disappeared. A treatment or two as soon as his ability to converge diminishes gives him immediate relief.

Case two. Patient, female, age 23. Occupation, teacher. Patient called for the first time last July. A thorough examination revealed a slight astigmatism and a very low convergence reserve. Treatments were suggested but it was found impossible to have them at this time. She was suffering from some diplopia and as a temporary measure I prescribed the following: O. U. +0.50 D. Cyl. axis 90 ⊃ 2 degree, prism base In. This gave relief until October when the trouble naturaly returned even worse than before. She now had to give up some of her work and have the treatments. The prismatic correction was removed and treatments given. At first progress was slow and she experienced much trouble with diplopia but this finally stopped and as her adduction increased she was able to reassume her former work. At the close of the treatment period she was able to read for three hours without a sign of discomfort.

ABSTRACT DEPARTMENT

X-ray Therapy in Certain Types of Glaucoma. Ralph I. Lloyd. Archives of Ophthalmology, Vol. LVI, No. 5, pp. 455.

Lloyd reports that very favorable results have been obtained from using X-ray therapy in glaucoma. He recites some of the results obtained in two cases.

The first case was a lady of 70 who was successfully operated upon for cataract of the right eye, vision was nearly normal. The left eye became blind due to the development of cataract which she refused to have an operation performed. Three years later she returned with a very hard, painful and inflamed eye. The cataract in the left eye had in the meantime passed into the over-ripe stage and the anterior chamber was filled with blood up to the level of the pupil. The eye was stony hard. Treatment with the usual line of drugs did not improve the condition in any way. A mild stimulating dose of X-ray brought immediate and striking results which were very satisfactory. The pain was relieved within a few hours, the blood absorbed slowly and the redness disappeared in about two weeks and the tension was reduced considerably.

The results in the second case were very much similar to the first.

Dr. Lloyd does not advocate using X-ray therapy in all cases of glaucoma,

but he feels in cases similar to the one mentioned the practitioner has nothing to lose and everything to gain when these treatments are used. The results are certain and prompt in most cases, and when results are not prompt he advises to discontinue the treatments. J. I. K.

Two Curious Optical Illusions. G. Lindsay Johnson. Archives of Ophthalmology, Vol. LVI, Number 5, pp. 465.

Johnson claims to have rediscovered by accident two optical illusions. The first one may be seen by any one in most restaurants and forms a proof of the Listing's Law. This he illustrates briefly as follows: If we sit down in the front of a white wall at a little distance from it, and attach a red vertical cross in front of us on the wall in such a position that when our line of vision is at right angles to the wall, the cross shall be directly in front of us. Then the visual field will be determined for the direction of fixation. This is far from being evident since it might be supposed that the eye ball is capable of rotation around its visual axis. But this never occurs beyond a small angle not exceeding at the most two or three degrees. So long as the head is rigidly kept in a vertical position, the eyes may roll in any direction, but the cross will always assume a vertical position, and not twist in any direction. But if we turn the head away from the primary position upwards or downwards or sideways to what we may call a secondary position, and then keeping the head in that position we gaze steadily at the cross for some moments (so as to obtain an after-image in the complimentary color), and then turn the eyes directly upwards and keep them still, we shall find that the cross remains upright as before, but directly we turn the eyes sideways to the right, the cross appears to turn partly around, the vertical arm turning through about 40 degrees to the right. So there is only one position of the head in which the cross remains erect; for every other position the cross turns partly round. This fulfills the Law of Listing.

And again:

If we look at a ventilator fan having two or four blades, such as can be found in almost any restaurant, which must be at a considerably higher level than the eye, and we sit about fifteen or twenty feet from it, and then raise our eyes so as to look vaguely (i. e., without focussing the eyes) in the direction of any spot about two or three yards above and to the right of the ventilator, the fans which were revolving clockwise, will appear to revolve in the opposite direction and to be tilted downwards and outwards at an angle of approximately 30 degrees from the horizontal plane.

This can readily be explained by Listing's Law, but the reason why the fans appear to revolve in the opposite direction, is due to another cause, and the solution is according to Johnson due to the fact that the center of rotation is not the same as the nodal point, in the optical system of the eye, but is situated 5mm behind the nodal point or points (for they are close together), whereby movements of objects out of the primary line of regard appear to turn in the opposite direction, when the head is not placed in the primary position.

The second optical illusion is as follows:

If you look at any isolated raised spot about the size of a pin's head or somewhat larger (and such spots formed by tiny blobs of whitewash or paint are very numerous), on a white wall about a foot or fifteen inches in front of you, and then raise the eyes slowly, and look vaguely into space without focussing the eyes, the spot will appear to travel in an irregular fashion upwards, exactly as an insect would do. In fact the illusion is sometimes so perfect as to deceive one into thinking that it is really an insect. But the moment one fixes one's eyes on to the spot the illusion disappears and the spot ceases to move, and its real nature is seen at once. Johnson thinks that this apparent movement is likewise due to the fact that the eye after it has been raised will slowly but unconsciously droop, thus causing the back of the eye and with it the macula to rise, and so the spot appears to run up the wall in an irregular manner. This very important fact that the eye does move in tiny jerks, and not in a steady sweep, was first discovered by Dr. Mulder, an ophthalmic surgeon practicing in Durban, Natal. T. O. B.

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THE ACADEMY AND ITS IDEALS

"'Tis not in mortals to command success
But we'll do more, Semproniers.
We'll deserve it."

Such is the spirit that prompts each member of the New York Academy of Optometry. While not unmindful of the many pitfalls awaiting him, he pledges himself to act in all things, great and small, as a professional man should act.

To do so may seem radical to those looking on but to those who have entered the professional stage, it means nothing more, nor less, than the adoption of very sound principle as a sound policy.

As professional men, we are yearning for success. Well, what safer course offers than the preparation of oneself to deserve it? But what constitutes success? Or, to plunge totally into the problem, wherein does the ideal of successful professional practice differ from the ideal of successful commercial practice, as conceived in Optometry today?

Probably one can find as many answers to this as we have men practicing. Every man has to meet and answer that question. Some do it with eyes open, some blindly, but all do it one way or the other. I tried to meet the issue with my eyes open and had some interesting experiences. Assuming that here I am reaching ones who recognize the value of an early decision and the far-reaching effect that decision is certain to have on their future, I will assume further that they will be interested in a straightforward statement as to how I answered the various phases of the question of commercial versus professional practice and how this led to the creation of the New York Academy of Optometry.

Thirty years ago, I finished the required course of study. Whether or not, it was much like that which you get at the Columbia, I must leave to you! Like you, or most of you, I had to make a start and a living. In the intensive courses of those early days, no time could be spared for suggestions on commercial or professional

[Speaking to the Optometric Classes at Columbia University, New York City, Dr. E. LeRoy Ryer, optometrist of that city, recently brought out the underlying fundamentals predominating the New York Academy of Optometry. As these Ideals permeate all the local optometric academies as well as the American Academy of Optometry and as Dr. Ryer has so forcefully rounded them together, and in view of the fact that the American Academy of Optometry is soon to meet in New York City, we believe the time now ripe to set these ideals before the profession, and we therefore submit for these reasons, a resume of Dr. Ryer's address.]

Editor, American Journal of Optometry.

practice, store or office location, nor even ethical or unethical practice.

Our teachers were intent upon training us to "fit eyes" and did not care a hoot where we fitted them. A little ocular anatomy and physiology—out of a book. Emmetropia and Ametropia. Weakest minus for Myopia. Strongest plus for Hyperopia. Weakest cylinder in any case. Let muscles alone. Get out and make your bread and butter without even a "and the Lord have mercy on your soul."

I started upstairs. Why? First, because I had neither the desire nor the money to rent a store. As no other optometrist to my knowledge was practising upstairs, at that time, you may judge how professional or how poor I was. Secondly, and I trust you will not urge me to state whether a *priori* or a *posteriori*, I believed that the commercial motto—*caveat emptor* did not apply to Optometry, that the patient could not judge for himself what was best for him, that my advice was the important factor and that as I was selling advice based upon special training, I was a professional man and as a professional man, I was on sound principle in establishing myself in a professional setting. I did. I never had cause to regret it.

Was it a struggle at first? How many worth while things are attained without a struggle? You can build a flimsy house quicker and easier than a substantial one, you can build a flimsy character quicker and easier than a sturdy one. You can build a cut-price store practice quicker than a good paying office practice. I took my chance. You may, nay, must, take yours.

And the question arose immediately as to whether I should charge a fee for examination or offer free examination. I knew a free examination promise was a lie. I did not think it wise to face my practice on a lie. I charged a fee and to this day have failed in no instance to charge a fee for examination except charity cases. That first fee was one dollar. You laugh. But it was more difficult to get a dollar fee at that time with the free examination idea running rampant than it is for you to get a ten dollar fee today with the fee principle established, shall I add, by us old practitioners for you?

No sooner was this barrier taken than another presented itself in the question shall oculist's prescriptions be filled? I could not follow this old custom and retain my self-respect so I discontinued it, willing to pay the price, to retain that self-respect. To my surprise, and chagrin, because I rather enjoyed the mild martyrdom, I soon found this course paying dividends.

Then arose the question of advertising signs and blatant letters—would my mind never cease pestering me with these problems! Professional men in other fields did not employ such means. I assumed experience had shown them sufficient reason. I ceased using them. Did I lose? I did. I lost the bargain hunting class who sought cheap glasses and opened the way to the acquisition of a class who sought professional service and were able to pay for it and today my greatest problem is to keep myself fit to render the service that is expected of me. Optometry's strongest asset is that there are more people willing to pay well for competent optometric service than there are optometrists with brains enough to offer, *so it can be recognized,* that service.

An early problem was—should I join the optometric societies? I was under age and the by-laws had to be suspended to take me in but in I went and for many years gave the better part of my time and efforts to local, state and national associations. I think it my plain duty to give the best I can to these societies, which insure our frontiers being guarded, giving us peace and safety in which to work back of the firing line.

Though these societies gave me much, they did not give me the intellectual stimulus I craved. Faithful efforts were made to supply it, the national association set apart the Physiologic Section for this purpose but it did not function, many men tried many plans—many souls were tried, mine among them—but to no avail. Why? It required twenty years for me to find the answer but I finally realized that the essential, necessary, logical, unavoidable, inevitable politics of these organizations, smother the educational activities. The political and legislative issues are always acute and demand immediate attention, and get it, while the educational issues are far-reaching

and apparently distant and seemingly do not require immediate attention and therefore get none and become relegated.

I maintained it was not fair to criticise the local, the state nor the national organization for not supplying these educational cravings and hoping to supply these needs through normal medium, I founded the New York Academy of Optometry. It worked.

You, of today with the contacts now established on all sides can not comprehend how much the Academy meant to me in bringing me into close association with men like Lockwood, Hotaling, Hull and Drakeford. For years we represented the membership of the New York Academy of Optometry. Why? Because we could find no others who measured up to what could be considered fair professional standards, who practised in professional offices, charged an honest examination fee in all cases other than charity cases, refused to fill oculists' prescriptions, refrained from unethical advertising such as billboards, electric signs, newspaper display or letters which made circus posters blush.

Today, the New York Academy of Optometry has a much larger membership and is open to every man of good character in New York City who conducts his practice on a strictly professional basis. Its problems interest equally every member. Any member's problem interests all the others. We are not high-brow. We may struggle with a technical problem one night but may devote the following meeting to the utilitarian problem of ways and means of stimulating practice or showing how better service may be rendered and commensurate fees obtained. In brief, we are professional optometrists banded together for the purpose of developing our calling and ourselves to the highest possible point of usefulness.

If you will forgive this little proselyting, I will say to you Columbia men that in my opinion, membership in the New York Academy is alone worth making all reasonable sacrifices that go at first with the establishment of a dignified, well paid, broadly useful professional practice.

I believe that local academies united in the American Academy of Optometry, are as essential to the educational and cultural development of Optometry as the A. O. A. is to its legislative and general development. Every practicing optometrist, taking what he does out of Optometry, because of the efforts of a relatively few, should support the A. O. A., and out of these any especially qualified and interested in the technical problems should give his best to the Academy. Surely, Columbia University is turning out much splendid Academy material. To such, the New York Academy holds out its arms—hoping the older membership can hold the standards high until such a time as the younger men are ready to relieve them and carry these standards to heights far above any the older men could hope to attain.

Some of you will not be in New York. All right, get with your own local Academy. If you find no local Academy—make one!

Dr. E. LeRoy Ryer.

PRICE ADVERTISING UNDERMINING PUBLIC'S CONFIDENCE IN OPTOMETRY

No matter how much and how fast we may try to build up the prestige of the profession of Optometry the cut price advertiser is undermining and destroying the accomplishments not only of the individual ethical Optometrists but that of organized Optometry as well. We have from time to time called attention in these columns to this menace. **A remedy must be found to effect a cure before this form of cancerous growth spreads much further.** We are not looking at this problem from a purely business or competitive stand-point, for any legitimate practitioner has advanced too far above the level of the price cutter to consider him as a competitor, and few, we are certain, would care to be placed on the same low plane with him. It is the effect that cut price advertising has on the public, and on the profession of Optometry in general that we are concerned with. Let us for a moment analyze the working of this vicious scheme.

The public is reading the cut price optical advertising constantly—for instance—glasses and examination complete, $3.50. This naturally becomes somewhat fixed in the reader's mind over a period of time. Later when one of these readers is in need of optical

service, he calls at the cut rate optical store with the idea fixed in his mind that he will get an eye examination and glasses complete for $3.50. Now, supposing upon examination it is found that the person requires a prescription of this order: O. D. +1.50 D. Sph. ⊂ 2.00 D. Cyl. axis 75 ⊂ 1Δ prism base up. O. S. +1.00 D. Sph. ⊂ +2.25 D. Cyl. axis 1.05 ⊂ 2° prism base down, and that the prescription **must** be made up in a tinted lens. What is the cut price Optometrist to do in a case like this? It is naturally out of the question for him to furnish a prescription of this order at the price of $3.50. To be sure, the cut rater can say that this is a special case and needs something different, but his patient can insist that he expects to get an eye examination and glasses complete for $3.50. To keep good faith with the patient and the Better Business Bureau, he can give the patient a pair of ready made glasses and for the time being the Better Business Bureau and the patient are satisfied that the transaction was honest. But was it? Most assuredly not! To give a person, who needs a prescription similar to the one just mentioned, a pair of glazed spectacles is the most corrupt, most dishonest, and most unethical practice imaginable. This is not only unethical but it is also **malpractice,** pure and simple.

Who is to blame for permitting such degrading practices to be carried on within the profession?

There are here two groups involved. First: The cut rate specialists; the group that by their false and misleading advertising has created such a condition that it has become impossible for them to conduct an honest ethical practice. Second: The State Boards of Examiners in States where such deceitful practices are carried on are both directly and indirectly responsible for permitting this group of optometric shysters to prey upon the public and take refuge behind their Optometric Licenses.

The State Board of Examiners that is sitting idly by while this disgraceful practice is being carried on is just as responsible for these deplorable conditions as are the price cutters themselves, because the Board members have been officially appointed to safeguard the public interest as well as the interest of the profession. By permitting these shysters to prey upon the public the State Boards are violating a public trust and are neglecting the interests of the profession with which they were entrusted. Such Board members who do not have sufficient back bone and courage to protect the interests of their profession and that of the public, should be made to resign.

Individual members, city and state Optometric Associations should demand that the members of their respective State Board of Examiners discharge their duties and obligations in such a way as to afford the greatest amount of protection to the profession of optometry and to the general public. Price advertisers should be made to feel the full force of the law. Fortunately for our profession some of the State Boards have already done this and the results are very gratifying. Will the rest of the State Boards fall in line? J. I. K.

HELMHOLTZ'S TREATISE ON PHYSIOLOGICAL OPTICS

The Optical Society of America, publishers of the three translated volumes of Helmholtz's Treatise on Physiological Optics, announce that beginning January 1, 1928, the price of this important work will be $10 per volume postpaid.

"In order that research in the field of physiological optics might receive the maximum possible stimulation from the distribution of Helmholtz's classical work, the Optical Society has offered this translation at $7 per volume, which covers cost of manufacture only. Accordingly, the Society now feels justified in raising the price of the remaining sets to $10 per volume, $30 per set."

Until December 31st, orders will be accepted at $7 per volume. Send orders to Professor F. K. Richtmyer, Cornell University, Ithaca, New York.

C. C. K.

OPTOMETRIC SCHOLARSHIPS

Writing with reference to optometric education at Columbia University, New York City, Professor James P. C. Southall says in the September issue of the Columbia Optometrist:

"The facilities and opportunities for studying Optometry in Columbia University at present, are very unusual.

"However, practically all of our students are from the metropolitan district. We ought to be getting students from all over the United States and from Canada and other English-speaking countries as well.

"If the optometrists in this country really want to support what we are trying to do here, it seems to me they ought to establish a number of scholarships covering the tuition fees. If the various State societies would each offer a scholarship to a picked man from each State every year, it would mean more for the promotion of Optometry as a profession than anything else that could be done at present. It would insure our having a fine group of men here always from all over the country."

Optometry has been too long indifferent to this important phase of educational work. Scholarships of the type recommended by Professor Southall could easily be established and carried by most State Societies without becoming a burden. It is hoped the profession will soon take steps to see to it that they are and thus give our educational centers the cooperation they so justly deserve.

C. C. K.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Official Organ of the Delaware, Iowa, Maryland, Michigan, Minnesota, Nebraska, North Dakota Oklahoma, Pennsylvania and Vermont Optometric Associations.

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NEW YORK SOCIETY BANQUET

The 30th anniversary banquet and reception of the New York Optometric Society, was held on November 10th, eve of the Armistice Day. Dr. J. I. Uttal, who is Chairman of the arrangement committee, claims that a most elaborate program had been put on for this affair.

Representatives of several civic, educational and allied professional circles, were present. Over two hundred couples attended.

SOUTHEASTERN CONGRESS

Plans were recently formulated for the fourth meeting of the Southeastern Congress to be held on Davis Island, Tampa, Florida, May, 1928. The officers and committees are:

Regional Director, J. C. DuBose, Vero Beach, Fla.

Assistant Regional Director, Robert N. Walker, Winston-Salem, N. C.

Secretary-treasurer, Esther M. Ingram, Winter Haven, Fla.

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MINNESOTA EXECUTIVE COMMITTEE MEETING

A meeting of the Minnesota State Executive Committee was held recently at the Radisson Hotel, Minneapolis.

Plans were laid to complete the financial campaign for the protection and development of Optometry.

The publicity and public clinics department of which Dr. J. I. Kurtz is Chairman, was authorized to purchase a moving picture machine and film to be used by members in good standing who are interested to lecture on the eye before different organizations.

Plans were laid for the next annual convention to be held in February at St. Paul. Dr. J. L. Frank, President of the Association, appointed Dr. Earl Jones as Chairman of the General Convention Arrangement Committee.

ARKANSAS OPTOMETRIC CONVENTION

The twenty-first annual convention of the Arkansas Optometric Association was held at the Hotel Marion, Little Rock, Arkansas. Dr. Vane C. Roy read a paper on "Accommodation and Convergence."

Dr. Wm. Needles delivered a series of educational lectures.

The following officers were reelected for the coming year: Dr. J. J. Livingston, President; Dr. C. H. Brown, Vice-president;

and Dr. Emmett Thompson, Secretary and Treasurer.

All committees were reappointed for another year.

OPTOMETRIST GIVES EXPERT TESTIMONY

Supreme Court of Virginia holds an optometrist to be competent to give expert testimony in damage suits. Dr. J. Doyles Watkins, Optometrist of Petersburg, Virginia, testified in a case of J. L. Wheeler, who was awarded a $10,000 verdict for the loss of vision in one eye and impairment of vision in the other eye.

The case was first tried in the Circuit Court of Chesterfield County, Va., at which time there was no objection raised by attorneys for the railway company to Dr. Watkins being sworn in as an expert witness. After Mr. Wheeler received a verdict of $10,000 damages, the railway company took an appeal to the Supreme Court of Appeals of Virginia, which upheld the action of the lower court.

Dr. Watkins, being the principal witness for the plaintiff and an Optometrist, attorney for the railway company made a vigorous attack on his competency to testify as an expert on diseases of the eye and asked the Supreme Court for a rehearing, which was granted. However, the Supreme Court again affirmed the action of the lower court. The Supreme Court of Appeals of Virginia, in its opinion, said:

"Plaintiff's witness, Dr. J. Watkins, a duly licensed and experienced Optometrist, examined the plaintiff's eyes with an ophthalmoscope in March, April and May, 1923, and found him suffering with optic neuritis which was producing atrophy of the optic nerve and causing a loss of vision. He says that optic neuritis is an inflammation of the optic nerve which may be produced by many causes, including lead poisoning, and that lead poisoning caused plaintiff to have optic neuritis which atrophied the optic nerve, and in May, 1923, was causing complete blindness, and that in December, 1923, he had no vision in his right eye. He agrees with other doctors who examined Wheeler that in 1924 plaintiff was suffering with simple glaucoma. He also testified that lead poison may result from paint which is taken into the system through the mouth or nose, or by absorption through the skin."

ST. LOUIS ACADEMY OF OPTOMETRY

The St. Louis Academy of Optometry held its first fall meeting October 12th, 1927. The subject discussed was Diagnosing Ocular Disease. An interesting discussion followed the paper. The next meeting of the Academy will be held Friday evening, November 11th. Accommodation and Convergence, will be the subject-matter of the evening.

Dr. Frank A. Ilg, Secretary.

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